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Stable Biogenic Silver Nanoparticles from *Syzygium nervosum* bud extract for Enhanced Catalytic, Antibacterial and Antifungal Properties

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1. Optimization of BioAgNPs synthesis

Throughout this experiment, the influence of the silver ions concentration on the formation of BioAgNPs was explored by varying the concentration of the $AgNO_3$ solution within the range of 0.5-2.0 mmol/L, while keeping the reaction temperature and reaction time constant at 45 ^oC and 60 min, respectively (Figure S1(a)). All of the spectra display an absorption peak at around 425 nm, which can be attributed to the SPR band of the BioAgNPs. The concentration of silver ions has a significant impact on the formation of AgNPs. The greater UV-Vis absorbance was brought about by an increase in the concentration of silver ions. However, when the concentration of silver ions was greater than 1.5 mmol/L, a modest shift of maximum wavelength toward bigger values was detected. This indicated the formation of AgNPs that were of a larger size. As a result, the correct concentration of $AgNO_3$ required to produce more stable AgNPs was determined to be 1.5 mmol/L and was selected.

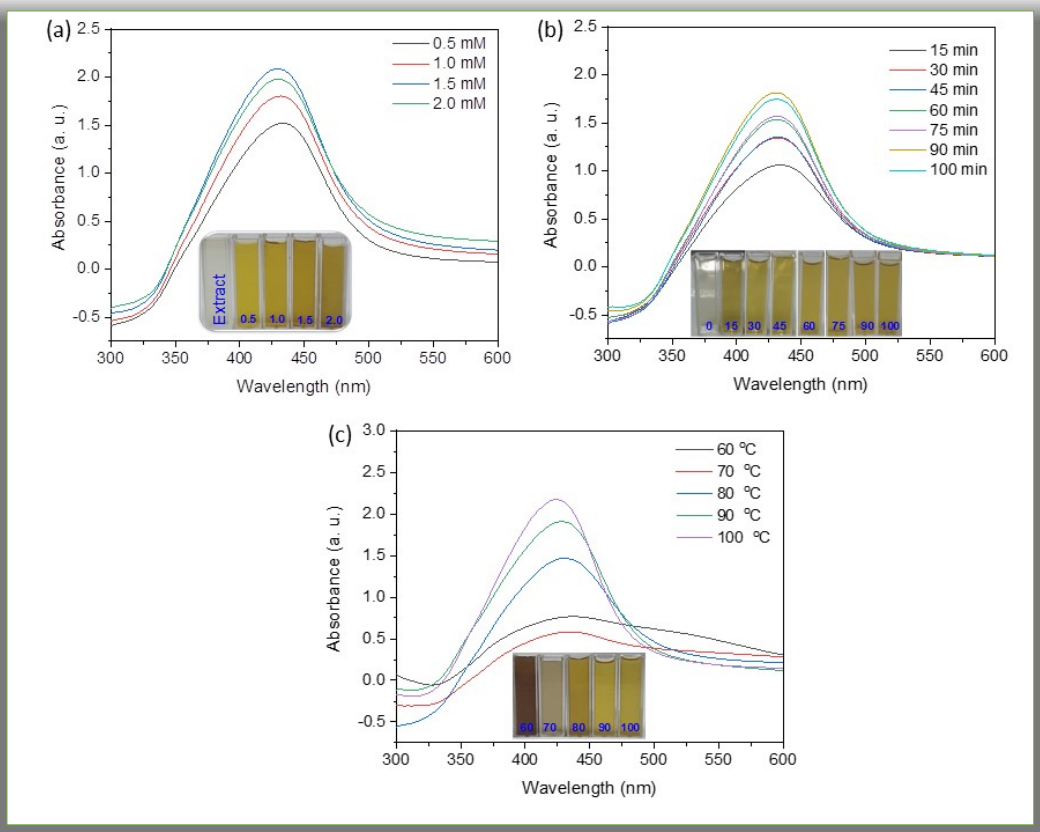

Fig. S1*. The UV-vis spectra of BioAgNPs synthesized at (a) different concentrations of $AgNO_3$, (b) different reaction time, and (c) different reaction temperatures*

After the predetermined amount of time had passed, the AgNPs solution (2.5 mL) that had been prepared at 45 °C with 1.5 mmol/L of Ag^+ was separated so that UV-Vis measurement could be carried out. This was done so that the reaction time for the synthesis of AgNPs could be optimized. As can be observed in Figure S1(b), the intensity of the distinctive UV-Vis peak for AgNPs increased progressively when the reaction time was extended from 30 to 60 min, and it reached its highest point after 90 min of reaction time. The aggregation of newly generated AgNPs may be to blame for the considerable drop in UV-Vis absorbance that occurred when the synthesis

period was allowed to continue for up to 100 min. Thus, a reaction time of 90 min was determined to be necessary for the continuation of the synthesis of AgNPs.

In the end, the optimal temperature for the reaction was studied within a temperature range of 60-100 °C, but the concentration of Ag^+ and the amount of time spent reacting remained the same (1.5 mmol/L and 80 min). The obtained results displayed in Figure S1(c) suggest that the temperature of the reaction had a substantial impact on the formation of BioAgNPs as well. The increase in temperature to 100 °C delivered an adequate quantity of energy to the silver ions, allowing for their transformation into nanoparticles. For this reason, the synthesis of BioAgNPs was carried out at a temperature of 100 °C, which was determined to be optimal.